Facilities and Services

2012/2013 Report
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Message from the AVP</td>
<td>03</td>
</tr>
<tr>
<td>II</td>
<td>Defining Sustainability</td>
<td>06</td>
</tr>
<tr>
<td>III</td>
<td>U of T's Commitments</td>
<td>07</td>
</tr>
<tr>
<td>IV</td>
<td><strong>Where we have been</strong> — Sustainability Milestones</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>The Role of Facilities &amp; Services — Building on a Visionary Foundation</td>
<td>18</td>
</tr>
<tr>
<td>V</td>
<td>Collaboration &amp; Engagement</td>
<td>21</td>
</tr>
<tr>
<td>VI</td>
<td><strong>Where we are today</strong> — Measuring our Performance</td>
<td>37</td>
</tr>
<tr>
<td>VII</td>
<td>Green Buildings</td>
<td>47</td>
</tr>
<tr>
<td>VIII</td>
<td><strong>Where we are going</strong> — The Road Ahead: Challenges &amp; Opportunities</td>
<td>50</td>
</tr>
<tr>
<td>IX</td>
<td>In the Media</td>
<td>54</td>
</tr>
</tbody>
</table>
Message from the Assistant Vice-President

Introduction

It is with great pleasure that I introduce our second Sustainability Report. Energy conservation has long been an integral part of the Facilities and Services (F&S) DNA. In fact, the department has literally been a pioneer in conservation efforts that can be traced back over 100 years. More recently, in the past decade, we have redoubled our efforts and moved beyond purely conservation efforts towards embedding sustainability into all of the functional areas which make up the department of Facilities and Services.

The addition of the Sustainability Office to our portfolio of services in 2006 has expanded our understanding and enlarged our focus beyond bricks and mortar to engage and collaborate with the university community at one of the largest and most research intensive academic campuses in North America. Our fundamental role is straightforward - we enable the institution’s core mission of excellence in teaching and research by providing a safe, clean, comfortable, attractive and sustainable physical environment. In relation to sustainability, our success lies in leveraging our students, staff and faculty’s combined talents and passion for the environment. Collaboration with the University community has led to some impressive innovations and initiatives within the living laboratory of the St. George Campus.

These initiatives will be highlighted within this report as well as metrics on our environmental footprint. Beyond where we have been and what we are currently doing, this report will provide a glimpse of where we are going collectively as a campus and institution.

Photos: U of T St. George Campus — Discover U of T [discover.utoronto.ca]
The St. George Campus — A City Within a City

The sheer scope and complexity of operations at the St. George Campus is analogous to running a small city. **With over 600 staff providing services to a daily community of approximately 70,000 people in 120 buildings**, we are uniquely positioned to understand and mitigate the University’s impact on the environment. One of our key responsibilities includes the management and operation of an extensive District Energy System which is largely invisible to the community. This system, which celebrated its 100th anniversary in 2012, includes our Central Steam Plant and is equipped with a 6 megawatt cogeneration turbine and flue heat recovery system, 3 chiller plants, and a Central Electrical Distribution system connecting over 100 buildings on the campus and third party buildings through four kilometres of underground tunnels. Other core duties include: operations and management of over 120 buildings, property management services, caretaking, campus police, fire prevention, landscaping, waste and recycling, trades, elevator services, the sustainability office and many others.

Leaders in Conservation

Since the Oil Crisis of the early 1970’s, the University has invested heavily in conservation. We hired our first full-time energy manager back in 1977. The department of Facilities and Services has completed hundreds of conservation projects yielding impressive savings in water, natural gas, and electricity. **In fact, since 1973 our activities at the St. George campus have resulted in the avoidance of over 1 million tonnes of greenhouse gas, saved 79 billion litres of water and 200 million dollars in utility expenses.**

Our recent efforts include championing the University’s first LEED Gold certified capital project, a massive retrofit to the Medical Science Building saving over $800,000 in natural gas and electricity per year, and running one of the most comprehensive and effective recycling programs in North America with a **diversion rate of over 71%**.
**Sustainability, Engagement, and Commitments**

Students, staff, and faculty have been the drivers of change. Working collaboratively with the sustainability office and other F&S departments, we have developed and undertaken many successful sustainability projects including the solar thermal array at Warren Stevens, the award winning “Rewire” project, and the Green Ambassador program to list a few. Engagement with the University community continues to grow and result in ever-expanding innovations.

Guiding our commitment going forward, President David Naylor signed *Ontario’s Commitment to a Greener World* in November 2009. The pledge is signed by the executive heads of twenty Ontario universities to reinforce their commitment to preserve and protect the environment. Subsequent to this commitment, the University of Toronto completed its first comprehensive greenhouse gas inventory in 2010.

The University of Toronto was named as one of *Canada’s Greenest Employers in 2012*. It is certainly an honour to be recognized for our commitment in creating a sustainable environment. This is another testament to the strength of the engagement and commitment of all U of T community members striving towards a unified goal of creating a greener world.

---

**The Road Ahead**

We have taken significant strides to reduce energy consumption, improve efficiency and reduce waste with very positive results. However, we still have a long way to go to reduce our environmental impact going forward. Future challenges that we will be facing ahead include the expansion of our summer semester (over 23,000 students), the university’s planned growth in our portfolio of buildings, and the University’s commitment to enhance research intensive and graduate activities at the St. George campus.

We look forward and are committed to working with students, faculty, and staff to continue our rich legacy of sustainable practices and to further integrate environmentally responsible activities throughout the institution as we move into the future.

---

*Ron Swail*
Assistant Vice-President
Facilities & Services
Defining Sustainability & the Triple Bottom-Line

As defined by the World Commission on Environment and Development (WCED, 1987), sustainability is to “meet the needs of the present without compromising the ability of the future generations to meet their own needs.” Going by this definition, sustainability requires us to be more efficient and minimize resource use in order to ensure the long-term viability of the present and future generations on this planet.

In order to follow the sustainable decision-making framework, the triple bottom line of sustainability – the environment, social dimensions, and economic factors – should be taken into consideration and be weighed equally in order to make environmentally conscious decisions rather than taking the traditional economic approach where market economics rule.

The Facilities and Services operation at the St. George campus has consistently followed this definition and decision-making framework for over 40 years. We facilitate research and teaching by seamlessly, and for the most part invisibly, managing the physical environment with the main objective of providing the highest quality physical environment to the University community at the lowest financial cost possible and with the smallest impact on the environment. This is a big challenge given the fact that the services we offer are so diverse.

We hope that this report will illustrate how we serve the triple bottom line of sustainability – the environment, the economy, and society – through our daily operations, numerous projects and exciting initiatives.

Illustrating the Triple Bottom-Line of Sustainability

FROM ME to WE: The Sustainability Story at 255 McCaul Street

The first LEED Gold project for the U of T located at 255 McCaul Street illustrates perfectly how a single project can address the triple bottom line of sustainability namely: the environmental factor, the social (or the human factor) and the economic factor.

This project addressed the environmental factors through its many sustainable features such as using less energy, making use of space more efficiently, capturing rainwater for re-use, natural lighting, operable windows, unobstructed views and many others. The financial savings from these features are more or less self explanatory. However, the most interesting aspect to this project is the social or human factors that were addressed and the impact was amazing!

The sustainable and improved space being enjoyed now by the staff of Facilities & Services and University Planning, Design & Construction became the new standard of how offices should be designed — space that encourages collaboration and teamwork; open spaces that people enjoy and therefore induce greater productivity and improve morale; above all, work space that the staff can be proud of in knowing that they are occupying an environmentally friendly workplace!
U of T’s Commitments

University Environment Protection Policy
(created in 1994; updated in 2010)

The University of Toronto recognized that its daily operations alone pose negative impacts to the environment. In 1994, the University Environment Protection Policy (UEPP) was enacted to ensure that the University took responsible measures to minimize these negative impacts on the environment, conserve natural resources, and respect biodiversity. More recently, this policy was reviewed and made more far-reaching. In 2010, a revised Environmental Protection Policy was adopted – one that encompasses our commitment to our progressively innovative initiatives and our continuous responsibility to protect the environment. The revised policy is also available online at:
http://www.governingcouncil.utoronto.ca/policies/enviro.htm

Environmental Protection Policy

Preamble

The University of Toronto is committed to being a positive and creative force in the protection and enhancement of the local and global environment, through its teaching, research and administrative operations. Recognizing that some of its activities, because of their scale and scope, have the potential, if not managed in compliance with the university’s established standards and practices, to have significant effects on the environment, the University as an institution, and all members of the University community, have a responsibility to society to act in ways consistent with the following principles and objectives:

Fundamental Principles

The University will:

- Meet and, where reasonably possible, exceed compliance with applicable federal, provincial and local environmental regulations and other requirements to which the University subscribes
- Operate so as to minimize negative impacts on the environment
- Adopt practices that reflect the conservation and wise use of natural resources
- Respect biodiversity

Specific Objectives

In adopting these fundamental principles, the University will be guided by ethical attitudes towards natural spaces and will take all reasonable steps to meet the following objectives:

- Minimize the use of energy, water and other resources, through efficient design, management and practice
- Minimize waste generation and actively manage the impact of waste, emissions, & effluents generated by University activities
- Minimize noise and odour pollution from University activities
U of T’s Commitments (continued)

Ontario’s Universities Committed to a Greener World
The University of Toronto is a signatory of the sustainability pledge, Ontario’s Universities Committed to a Greener World. The pledge reinforces our commitment to continue practicing the three Rs (reduce, reuse, recycle) and to invest in the environmental protection and future well-being of the province. [Link to pledge]

Campus Master Plans
The Campus Master Plans for the U of T campuses provide a framework for future development. There are seven headings identified in the planning principles that have effectively guided the University in planning its facilities and grounds. Sustainability is one of these seven over-arching principles that provide a framework to the master plans. To learn more, visit: [Link to Campus Master Plans]

Design Standards
The sustainable design standards were developed in order to effectively facilitate the planning, design and implementation of new construction and major renovation projects. The document is meant to be a dynamic and fluid document that evolves as it incorporates innovative developments, concepts, feedback and practical applications. Check out the details at: [Link to Design Standards]

Being a signatory of the Ontario’s Universities Committed to a Greener World pledge reinforces U of T's commitment to preserve and protect the environment and the future well-being of the province and re-affirms its commitment to demonstrate leadership in advancing a greener world.

A PLEDGE FROM THE EXECUTIVE HEADS

NOVEMBER 2009

The Ontario university community is deeply aware of the challenges that face the world arising from climate change and the degradation of natural environments. Our universities accept this special responsibility on three scores: to assist in finding solutions to the challenges of environmental sustainability; to share knowledge about sustainability and climate change; and to incorporate, wherever possible, principles of sustainability into our own operations.

Ontario universities, ranging in size from small and rural institutions to large and urban ones, began work on the creation of sustainable campuses many years ago, and we continue to demonstrate leadership in advancing a greener world. In particular, Ontario universities will work together to do the following:

- Develop and implement multi-pronged strategies to reduce energy consumption.
- Promote reuse and recycling in all aspects of our operations.
- Transition purchasing decisions toward producers and suppliers who have adopted environmentally responsible practices.
- Ensure the availability of locally grown and fair-trade foods and beverages on our campuses.
- Build new facilities in accordance with principles of sustainability and energy efficiency.
- Renovate existing facilities to improve energy efficiency and reduce waste.
- Seek to preserve green space on our campuses wherever possible.
- Share information across campuses regarding best practices from the standpoint of sustainability and environmental impact.
- Develop institutional environmental sustainability plans with measurable objectives.
- Publish an annual report documenting the efforts of all Ontario universities to modify their operations in ways that are responsive to the threats of global climate change and environmental degradation.

We further accept our responsibility to do the following:

- Provide forums for the discussion and development of solutions regarding sustainability issues.
- Share research insights and best practices regarding climate change and sustainable development.
- Work in partnership with governments, the public, businesses and others in the academic world so that we may together create an environmentally sustainable Ontario.

[Link to the pledge]

[Link to Design Standards]

[Link to Campus Master Plans]
The University of Toronto’s three campuses are unique in a number of ways. A perfect demonstration of this statement is the fact that each campus has taken a slightly different approach to promoting sustainability through various initiatives and projects, resulting in a rich array of unique programs and opportunities for partnerships within the three campuses. The University established a Tri-Campus Sustainability Board in 2007 to bring together representatives from each campus and to cultivate a forum that will further encourage the promotion of diverse initiatives and collaboration.

The Board promotes communication and mutual support for related sustainability initiatives in different sites and divisions of the University. While the individual campuses set their own agendas and determine their own priorities, the Sustainability Board helps to find opportunities where the three campuses can coordinate with one another on University-wide initiatives. The Board reviews annual reports and strategic plans developed by all three campuses to monitor the progress of their sustainability initiatives.

Beyond policies and commitments, the University has invested heavily in utilities conservation over the past four decades. The Facilities and Services department has completed literally hundreds of conservation projects both large and small. The total investment in these projects is close to $50 million. A few of the noteworthy investments include:

- Annual energy reduction funding (started in 1990) to fund small scale projects (originally $250,000 per year; now at $500,000)
- The installation of a 6 megawatt cogeneration system in our Central Steam Plant (1992)
- Two major campus-wide lighting retrofits (1995 and 2006)
- The flue gas heat-recovery system (2000)
- Cool roofing standard on all new roofs (started in 2004); over half a million square feet installed.
- Chiller retrofit project replacing 18 old machines with much more efficient units (2008)
- Massive solar thermal installation at Warren Stevens Athletic Centre (2010) - over 100 solar panels installed
- Comprehensive building metering project (2011)
- Major variable speed drive (VSD) and control system retrofit to the Medical Science Building (2012) saving over $800,000 per year with a simple payback of 13 months and an ROI of over 80%.

U of T’s Commitments

Sustainable Roof
In the spotlight …

Ban the Bottle

Did you know...

In response to this initiative, Facilities & Services (Property Management) provided tap water stations in various buildings — to date, there are 57 buildings that have existing or newly installed tap water stations!

Student-initiated commitment

Engaged students working with University administration to raise awareness

Graduate students Leanne Rasmussen (left) and Anda Petro demonstrate the new water fountain installed in the Sidney Smith Hall cafeteria. In 2011, the University of Toronto began to phase out sales of bottled water across its three campuses. In doing so, U of T joined over a dozen other campuses that have pledged to go bottled water-free. The ban comes after a campaign spearheaded by enthusiastic U of T students who raised awareness on campus of the environmental and social impact of the commodification of water.

Source: U of T Community Impact Report
## Where we have been ...

### F&S Sustainability Milestones 1912-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1912</td>
<td>Opening of the Central Steam Plant</td>
</tr>
<tr>
<td>1912</td>
<td>First full-time energy manager hired.</td>
</tr>
<tr>
<td>1964</td>
<td>Central Steam Plant moved off coal to oil and natural gas.</td>
</tr>
<tr>
<td>1973</td>
<td>First lighting retrofit</td>
</tr>
<tr>
<td>1977</td>
<td>Installed 20,000 phantom fluorescent tubes across campus</td>
</tr>
<tr>
<td>1979</td>
<td>Installed motion detectors to flush urinals across campus saving large volumes of water.</td>
</tr>
<tr>
<td>1981</td>
<td>Pioneered an in-house building control system</td>
</tr>
<tr>
<td>1981</td>
<td>Installed 20,000 phantom fluorescent tubes across campus</td>
</tr>
<tr>
<td>1989</td>
<td>Installed motion detectors to flush urinals across campus saving large volumes of water.</td>
</tr>
<tr>
<td>1990</td>
<td>U of T established an annual $250,000 energy management fund to support energy reduction initiatives.</td>
</tr>
<tr>
<td>1990</td>
<td>Co-generation system installed</td>
</tr>
<tr>
<td>1991</td>
<td>U of T adopted its University Environmental Protection Policy — one of the first institutions in North America to develop one.</td>
</tr>
<tr>
<td>1993</td>
<td>Co-generation system installed</td>
</tr>
<tr>
<td>1994</td>
<td>U of T adopted its University Environmental Protection Policy — one of the first institutions in North America to develop one.</td>
</tr>
<tr>
<td>1995</td>
<td>Lighting retrofit</td>
</tr>
</tbody>
</table>

**For a comprehensive list of our sustainability milestones, visit:**
http://www.sustain.fs.utoronto.ca/sustainability-timeline/
Where we have been ...

**F&S Sustainability Milestones 1912-2013 (continued)**

**2000**
Flue gas heat-recovery system is installed to harvest heat from exhaust gases going up the chimney at the Steam Plant.

**2003**
Natural Resources Canada gave U of T its prestigious **Energy Efficiency Award** for energy innovators in recognition of our commitment to energy efficiency and reducing GHG emissions.

**2006**
Campus Moving replaced three gasoline vehicles with three **natural gas** vehicles.

Campus Police purchased their first **hybrid car** making U of T the **first Canadian university** to own a hybrid vehicle.

**2002**
Bahen Centre for Information Technology Building (BCIT) connected to the flue gas heat-recovery system becoming the first building to be 100% heated with energy that would otherwise have gone up the chimney.

**2004**
**Sustainability Office established** with academic and student representation.

**2005**
**Washroom upgrades** started on St. George campus with **cutting-edge sustainable standards**: energy efficient lighting, durable materials for long life and hands-free devices to reduce water consumption and improve hygiene.

**Green Cleaning** and **Sustainable Roofing Standard** were introduced. Visit [http://www.fs.utoronto.ca/caretaking/green.htm](http://www.fs.utoronto.ca/caretaking/green.htm) for more details regarding the green cleaning program.

For a comprehensive list of our sustainability milestones, visit: [http://www.sustain.fs.utoronto.ca/sustainability-timeline/](http://www.sustain.fs.utoronto.ca/sustainability-timeline/)
Where we have been ...

**F&S Sustainability Milestones 1912-2013 (continued)**

**2007**

**Sustainability Board** was established at the Assistant Vice-President level.

U of T banned the use of **incandescent light bulbs** saving $400,000 per year.

**Undertook a $20M energy reduction project** changing 80,000 lamps with high-efficiency T8 lighting and 18 stand-alone chillers containing ozone-depleting CFCs with high-efficiency.

**U of T St. George Campus received the City of Toronto Environmental Award of Excellence** which recognized our Sustainability Office’s Rewire Energy Campaign and our $20 million Energy Reduction Project.

**2008**

F&S established a **work from home program.** Virtual workers share a workstation at their home base.

**2009**

The Exam Centre became U of T’s first **LEED Gold Certified** project. This project established a new U of T office standard combining **high-performance green building features** with **best practice interior design elements** creating a work environment which is both extremely efficient and effective.

Our Sustainability Office won a **national award from the Canadian Association of University Business Officers** (CAUBO). We were awarded the **CAUBO Quality and Productivity Award** for developing **Rewire.** See page 23 for more information regarding Rewire.

Began retrofitting 2,000 exterior wall lamps with **LED and induction technology** designed to use 40% less energy and last longer than conventional high-pressure sodium.

The University installed the largest **solar thermal array** in the Greater Toronto Area at the Warren Stevens Athletic Centre.

*For a comprehensive list of our sustainability milestones, visit: [http://www.sustain.fs.utoronto.ca/sustainability-timeline/](http://www.sustain.fs.utoronto.ca/sustainability-timeline/)*
Where we have been ...

F&S Sustainability Milestones 1912-2013 (continued)

2010

Revised University Environmental Protection Policy (UEPP) approved. 
See page 7 for the full copy of the revised policy

U-Compost Program started by U of T Food and Beverage Services. See page 30 for more information

Utilities Sub-Metering pilot projects completed. This helps F&S determine specific energy profiles for individual buildings to help building occupants be aware of their conservation efforts.

2011

MSB “de-lamping” Project:
By adjusting lighting levels in the Medical Sciences Building and removing some lighting fixtures and lamps in the corridors, we saved 34,800 kWh annually. This initiative was brought to F&S by a professor within the Medical Science Building.

Re-commissioning of 246 Bloor Street West
Cistern installation at the Mining Building and South Borden Building.

Purchase of three electric vehicles to replace old gasoline-run vehicles for F&S fleet.

Survey of steam traps resulting in an annual thermal saving of 2,134 mmBTU

Electronic Sub-Metering Phase I completed

Replacement of water-cooled A/C units with air-cooled units. Check page 27 for more regarding this initiative

Automated Irrigation System
This system has saved us 23,520,278 litres of water between the summers of 2011 and 2012 alone — an equivalent of approximately 10 of the Athletic Centre Pools!

71.4% diversion rate
The highest one to date and one of the highest of any North American institution! Check page 28 for more regarding our best in class recycling program.

For a comprehensive list of our sustainability milestones, visit: 
http://www.sustain.fs.utoronto.ca/sustainability-timeline/
Where we have been ...

**F&S Sustainability Milestones 1912-2013 (continued)**

### 2012

**Launched the Utility Reduction Revolving Fund (URRF)** — a green revolving fund for the built environment. The main intent of the fund is to provide comprehensive funding to support and stimulate projects that will result in reducing the University’s environmental footprint and provide utilities savings with a maximum 5 year payback. See page 25 for more information regarding the URRF.

**Pilot Project for URRF — Chemistry Undergrad Scheduling Project**

See page 32 for more information regarding this initiative.

**Named as one of Canada’s Greenest Employers**

**Hired an Embedded Energy Manager in partnership with Toronto Hydro**

**Completed LED/Induction Exterior Lighting Retrofit Project**

### 100th anniversary of U of T’s District Energy System

In 2012, the University of Toronto St. George Campus celebrated the centennial of one of Canada’s first institutional district energy systems.

Check the in the spotlight story on page 16 for more regarding this milestone celebration.

**MSB Major HVAC retrofit**

Installation of cutting-edge variable speed drive fan technology, improved building automation, and wireless room level thermostatic controls in the Medical Science Building (MSB) will drastically reduce the building’s annual energy consumption and will save more than $800,000 each year.

Check the in the spotlight story on page 17 for more regarding this exciting initiative.

### 2013

**First URRF project: OISE Building Automation System**

This project will provide more consistent indoor air quality for the number of people in OISE (Ontario Institute for Studies in Education) and at a reduced energy cost. Estimated savings are $361,250/year with a 2.4 year simple payback.

**Move of Bike Chain**

The North Borden Building at 563 Spadina Avenue (Room 109/109A) will be Bikechain’s new home.

---

*For a comprehensive list of our sustainability milestones, visit:*  
[http://www.sustain.fs.utoronto.ca/sustainability-timeline/](http://www.sustain.fs.utoronto.ca/sustainability-timeline/)
In the spotlight ...  
A CENTURY OF SUSTAINABLY GENERATING HEAT

It was a concept that was ahead of its time. In 1912, the University of Toronto opened a steam plant to supply multiple buildings with heating and cooling services on the St. George campus. Today, 100 years after opening the plant, the university’s district energy systems provide these services to some 75 buildings on the downtown campus.

Besides saving real estate and avoiding housing a boiler in each building, the district energy system allows for global improvements to the university’s energy provision. “We can make efficiency improvements all at once, in one place, instead of at many different places,” says Bruce Dodds, Director of Utilities and Building Operations. “You have more reliability through redundancy of equipment. And we can also buy gas and electricity in bulk.” Energy-saving projects continued. For example, in the 1990s the university was the first in Ontario to put in a multitasking gas turbine generation facility. “When you put gas in a turbine to make electricity, most of the energy is heated and we don’t waste that,” Dodds says. “The co-generation process takes waste heat, puts it through a waste heat boiler and sends it into our heating system, so we get very high efficiencies.”

“U of T was ahead of its time,” says Bruce Ander, President and CEO of Markham District Energy and the Canadian representative to the International District Energy Association. “District energy systems are becoming increasingly common in Canada and are very common in Europe. But 100 years ago, there were few places in Canada like U of T that had the foresight to build a district energy system.” Today there are 120 district energy systems across Canada.

While the benefit to the university in efficiencies and cost savings are clear, there’s also a direct benefit to the neighbours surrounding this downtown university. “The local community doesn’t have to put up with seeing plumes of gas that come out of every single building — we just have one,” says Dodds. “We try to get higher and higher efficiencies all the time so that’s a good thing for the environment.”

Source: U of T Community Impact Report

Check it out on YouTube: www.youtube.com/watch?v=7jtnNkZsk3M or scan the code with your smartphone
In the spotlight ...

MSB Major HVAC Retrofit — Fueling Research While Saving Energy

U of T Drastically Reduces Energy Use in Medical Sciences Building

Thanks to an energy reduction initiative supported by both U of T’s Facilities and Services Department and the Faculty of Medicine, the Medical Sciences Building (MSB) is drastically reducing its annual energy consumption and saving more than $800,000 each year.

Conceived and spearheaded by Chun Lee, U of T’s Area Manager of Mechanical Operations and Maintenance, the university installed cutting-edge variable speed drive fan technology, improved building automation, and wireless room level thermostatic controls in the MSB so airflow and temperature can now be automatically adjusted based on the building’s occupancy needs. This is a great example of how the university leverages state-of-the-art technology to operate more energy efficient buildings.

The $1.5 million initiative will have a phenomenal simple payback period of approximately 13 months and an ROI of over 80% thanks to significant financial incentives of $600,000 provided through our institutional partners at Toronto Hydro and Enbridge Gas.
**THE ROLE OF FACILITIES AND SERVICES**

*in cultivating a culture of sustainability at the St. George Campus*

**- BUILDING ON A CENTURY-OLD COMMITMENT TO ENERGY CONSERVATION!**

College and University campuses are unique in terms of the variety and complexity of their facilities operations. Perhaps no other type of organization under one management has a more diverse facility infrastructure. At the St. George campus, we serve a student population of over 56,000 – one of the largest single campus student populations in North America. Daily occupancy can exceed 70,000 people placing St. George in line with the 75th largest municipality in Canada by population.

The portfolio of buildings on the campus is unique. We manage over **120 buildings that are widely diverse in age, size, design and function**. Building functions include: residences, athletic facilities, lecture halls and classroom buildings, office buildings, high tech research facilities, laboratory facilities, and art galleries. Ages of the buildings range from 155 years old to brand new facilities. Many of our campus buildings have heritage designations with 36 being over one-hundred years old. Campus buildings vary broadly in scale as well ranging from a few thousand to almost 1 million gross square feet.

Beyond the significant diversity of the portfolio, the St. George campus has an extensive district energy system which supplies heat, electricity, and chilled water to most of the campus buildings through kilometres of underground tunnels. The **combined replacement value** of the St. George physical assets managed by Facilities and Services **exceeds $3 billion**. Therefore, it is not surprising that the operational role of Facilities and Services in running one of North America’s largest campuses results in the production of most of the campus’s greenhouse gas emissions.
The Role of Facilities and Services

in cultivating a culture of sustainability at the St. George Campus

- Building on a Century-old Commitment to Energy Conservation!

Our department is specifically responsible for:

Operation and management of the St. George campus district energy system which includes the central steam plant, three chiller plants and the electrical distribution across the campus. These systems provide heat, chilled water, and electricity to the majority of buildings on the campus through kilometres of tunnels, pipes and wires;

Operation, management, and long term stewardship of the campus portfolio of buildings;

Providing building services that support occupants through the departments of property management, trade services, elevator services, fire prevention, caretaking, mail and moving services;

Providing campus-wide services including landscaping, snow removal, waste & recycling, and campus police.

Given its responsibilities, the department of Facilities and Services is uniquely positioned to address the campus environmental footprint on a large scale. Fortunately, conservation and sustainability have always been the guiding principles in the operation and stewardship of the campus facilities, property, and resources. The department of Facilities and Services strives to continually innovate and improve the services it provides to the University community and in so doing, become more efficient, effective and sustainable.
Four Decades of Conservation

For the past 40 years, conservation has constantly been a core value of our department. Long before sustainability became the priority to most organizations, Facilities and Services was already deeply committed to conservation.

By conserving resources, we have been very successful in reducing operating expenses and the campus environmental footprint. Over this period of time, we have literally completed hundreds of conservation projects which have resulted in tremendous savings in water, natural gas, electricity and operating costs.

The University is recognized as a pioneer in energy and water conservation. Many large Universities began to hire energy reduction managers just a few short years ago however, our department had already filled this position way back in 1977.

When Ontario Hydro curtailed their incentives for saving energy in the early 1990s, the University provided the department of Facilities and Services with $250,000 per year to undertake energy reduction projects. Presently, this funding stands at $500,000 per year. When this department presented very large projects to save resources such as the cogeneration plant installation in 1990, the flue heat recovery system in 2000, and the $20 million energy reduction strategy in 2006, the University consistently responded with the requested funding.

The results have been and continue to be impressive. Since 1973, we have saved 79 billion litres of water, $200 million in operating funds, and our recycling efforts have saved the equivalent of 250,000 trees. Most impressive is our avoidance of over 1 million tonnes of greenhouse gas.

However, despite our efforts, we still have a long way to go in fighting climate change.

The St. George Sustainability Office
www.sustainability.utoronto.ca

Created in 2004, the St. George Sustainability Office (SO) is a group empowered to develop and promote a culture of sustainability and the engagement of staff, students and faculty members. The office acts as a resource hub for sustainability awareness, student and staff led programs, services and collaboration on campus, the engagement of the campus community through a variety of programs, best practice modules, social media, communications, and outreach. Through the efforts of the Sustainability Office and staff, faculty, and students on campus, programs and collaborative opportunities have emerged to create meaningful learning and workplace experiences for the University community.

Numerous “green” committees have been established with the support of the Sustainability Office including the following:

**Sustainability Advisory Committee**
The purpose of the Advisory Committee is to generate and promote sustainability initiatives at all levels of University governance, as well as to provide campus-specific guidance on program development and delivery, and on future plans of the St. George Sustainability Office. The Committee also assists in creating and strengthening partnerships with the Office’s campus community (primarily students, faculty & staff) and provides accountability to the Office’s target audiences.

More information available at: http://sustainability.utoronto.ca/about/supporters/ac.htm

**Sustainability Advisory Committee for the Ontario Institute for Studies in Education (OISE)**
The objective of OISE’s Sustainability Advisory Committee (SAC) is to provide a forum for the advancement of sustainability goals within the OISE community, in collaboration with similar initiatives and responsibilities within the University of Toronto.

More information available at: http://www.oise.utoronto.ca/cao/Sustainability_Advisory_Committee/index.html

**Faculty of Medicine Green Committee**
The Faculty of Medicine Green Committee has been working since the summer of 2008 to develop a list of priorities which will provide leadership to the Faculty with respect to development and implementation of environmentally-sound practices one of which is the creation and maintenance of a website that provides information to members of the Faculty regarding environmental ‘best practices’ and resources.

More information available at: http://www.facmed.utoronto.ca/about/governance/green.htm
Sustainability Office Projects that Promote Student, Faculty, and Staff Engagement

In January 2011, the Green Ambassadors Network was launched by the Sustainability Office. The Green Ambassadors are staff and faculty members from across U of T who work to make their offices more environmentally friendly. The Ambassadors meet monthly and maintain an email list to share ideas and challenges. The Sustainability Office supports them with materials and expertise.

University of Toronto Food Services employs students who form the “Green Ambassadors”. This group works with students in cafeterias to encourage and educate them about the benefits of composting organic waste, reusing or recycling other materials, and adopting more sustainable practices in everyday life.

Learn more by visiting: http://sustainability.utoronto.ca/projects/ambassadors.htm

Students, staff and faculty on St. George campus are all encouraged to make use of Bikechain, a do-it-yourself bike repair shop on campus. Originally run by the Sustainability Office, Bikechain now exists as an independent non-profit entity. Bikechain has recently reached its 20,000th service, and continues to expand its offerings. Not only do they teach bike maintenance and repair free of charge, they also offer a free bike lending program to students on campus. Truly a supporter of Campus Sustainability, the Department of Facilities and Services recently donated a larger and more accessible space to Bikechain, which will allow their initiatives to thrive even more.
Collaboration & Engagement

Sustainability Office Projects that Promote Student, Faculty, and Staff Engagement

The Green Offices program, launched in January 2013 at St. George Campus, is a certification program designed to recognize sustainable workplace achievements. Office members are encouraged to work as a team to address actions from lunch waste to double-sided printing and IT purchases to cleaning products (see image below for target areas) and their efforts are rewarded with “Green Office Certification” at one of four levels: sprout, sapling, tree, or forest.

http://sustainability.utoronto.ca/projects/greenoffices.htm

In the spotlight ...

Rewire

One of the most successful initiatives of the St. George Sustainability Office is the award-winning Rewire program. Rewire empowers students to reduce their energy consumption in residences by promoting small behaviour changes with big environmental impacts. Adopting simple pro-environmental habits, like turning off lights, is the first step to a better campus and environment.

The 2012-2013 school year marks the launch of a new and improved Rewire program, with more materials and resources available to Rewire reps than ever before - and with more opportunities to customize and tailor the program to each rep’s residence and interests.

http://sustainability.utoronto.ca/projects/rewire.htm
Collaboration & Engagement

F&S working with the wider university community to achieve greater environmental impact

Sustainability Office Projects that Promote Student, Faculty, and Staff Engagement

Faces of Sustainability Feature
Sustainability stories are numerous at the St. George campus. In order to broadcast the success of these initiatives, instil pride in the campus community and inspire future efforts, the Strategic Communications group and Sustainability Office have partnered to produce sustainability features in the campus newspaper, “the Bulletin”.

A biweekly “Faces of Sustainability” feature is included in the campus staff and faculty news bulletin which highlights individuals from faculty, students and staff on campus who are actively taking steps towards greening their workplace, their roles on campus, and their own lives. The feature is designed to inspire ideas and action from other U of T members, to show that everyone on campus can contribute to sustainability and be recognized for doing so.

http://sustainability.utoronto.ca/news/faces.htm

Faces of Sustainability Feature:
TED KENT, SENIOR PROPERTY MANAGER

Ted Kent is the Senior Property Manager at St. George Campus. He oversees the daily operations of the property management group, in addition to being a property manager himself.

ONE-ON-ONE Q&A (excerpt):

How do you define sustainability?
Real simple answer: use less. Reduce consumption of resources like energy, water, steam. The other thing is reuse, and that’s important to me: as a city and a society we are not reusing enough of the materials that come out of our construction jobs. Paint, drywall, steel – these are reusable and/or recyclable.

What do you do on campus related to the environment/sustainability?
Facilities and Services (F&S) is always working on projects that implement new standards for campus buildings, especially those standards that will generate energy savings. The F&S design standards cover an amazing number of things: LED lighting, roofing efficiency, elevator conversions, plumbing… Plus, the current standard is that anything we bring in – even something as simple as new carpet – needs to be recyclable down the road.

Property Management’s work is transparent: when students and staff show up for class or work, the lights turn on, the temperature is right, the air quality is great… and so they don’t even think about us.

(In the photo above, Ted is holding an inexpensive LED bulb - a new technology being put to especially good use in Governing Council)
The Energy and Resource Management Fund (ERMF) was created by the St. George Facilities and Services Department (F&S) to enable staff, faculty and students to suggest energy and water conserving retrofits for their workspace and learning environments. People who see an opportunity in their local space can submit an energy saving idea for consideration to F & S who then assesses the concept in more detail. Successful project proposals receive funding support from Facilities and Services to implement the projects, examples of which include high efficiency window film, lighting, insulation, air conditioning, and occupancy-sensor controls for lights. The Sustainability Office assists with promoting and vetting applications. To date, the ERM Fund has contributed a total of $115,855 to eight projects. Projected annual energy savings are estimated at 215,356 kWh. 
http://sustainability.utoronto.ca/projects/fund.htm

The Utility Reduction Revolving Fund (URRF) is an internal green revolving fund for the built environment. The intent is to provide comprehensive and programmatic funding to support and stimulate projects that will result in reducing the University’s environmental footprint and provide utilities savings with a maximum 5 year payback across the entire University. The model is simple: money will be loaned to selected projects to cover all capital costs. The savings resulting from the project are tracked and will pay back the initial capital investment from the fund over time. After all of the funding is returned to the fund, the savings will go directly to the department or faculty in the building where the project took place through reduced utilities consumption.

For 5 years, the U of T Green Ribbon Awards has been recognizing the outstanding contributions and achievements of staff, students, faculty and external partners who have been recognized for their environmental leadership, conserved natural resources and promoted sustainability at the St. George campus. Each year, the Sustainability Office solicits nominations from the campus community and encourages voting to select winners in the Student Group, Faculty, Staff, and Corporate Partner sections. The Department of Facilities and Services hosts an awards celebration each spring where winners are recognized and presented with their Green Ribbon Awards. This year’s winners include a student run resource friendly food service, a professor of environmental engineering studies, campus recycling and waste management staff and Toronto Hydro for their on-going support of U of T’s energy footprint reduction programs.

http://sustainability.utoronto.ca/participate/GRA.htm
Staff and students collaborate on sustainability

When members of a University of Toronto urban sustainability class were assigned to develop ideas to reduce their environmental impact last year, a few enterprising students looked up. Way up.

And they decided to install a rain barrel system on the roof of the Galbraith Building at 35 St. George Street.

Property manager Nadeem Ahmed immediately saw its potential, and he’s been impressed by how the project involved different organizations on campus. “This is a great example of how different sectors are coming together for a common goal,” says Ahmed.

With a $100 grant from the University of Toronto Environmental Resource Network (UTERN), the rain barrel was purchased and connected to a robust rainwater collection system. There are high hopes for the system to help irrigate the volunteer-run rooftop SkyGarden - a venture that produces up to 500 lbs. of organic vegetables every year which is donated to the student food bank on campus.

Sarah Chu was one of the students in the urban sustainability class. She’s proud of what her classmates and the school have accomplished.

“I think our project is a great step forward to realizing U of T’s potential to capture and re-use rainwater in a very simple and cost-effective way,” she says.

The project could also help pave the way for more rooftop rain barrels in the city. A 2010 study by the Toronto and Region Conservation Authority found that even the simplest rainwater harvesting system could divert up to 42% of rainwater away from storm drains, taking pressure off of local storm systems and providing non-potable water for facilities’ operations.

Chu hopes the rain barrel project will inspire urban dwellers to think about H2O in new ways.

“Hopefully, our system will serve as an active visual to get students thinking about how to conserve water on campus, as well as other sites where rain barrels could work”.

Author: Matt Stergiou and Tyler Hunt
http://news.utoronto.ca/staff-and-students-collaborate-sustainability
Facilities & Services Energy Reduction Committee

An internal committee that discusses best practices to reduce energy in the numerous buildings U of T owns. The Committee is chaired by the Assistant Vice-President, Facilities and Services and the rest of the committee members are comprised of the sustainability director, utilities and building operations director, energy manager, building operations area managers and staff who all collaborate with various faculties and departments to implement energy reduction initiatives and projects.

Below is an example of numerous projects they have completed.

Since 2009, we have expanded our water savings initiatives by continuing to replace water-cooled A/C units with air-cooled units in many more locations throughout the campus. Through these initiatives, along with improvements in operations and low use fixtures, we save 340,687,061 litres of water each year.

In the spotlight ...

“Sun Showers”
Solar Thermal Array at the Warren Stevens Athletic Centre

A 100-panel solar hot water system has operated atop of the Athletic Centre since 2009, generating hot water for showers and taps. The project was conceived by an undergraduate student and employee of the Sustainability Office with the support of the Facilities and Services department and government grants.

The system performance is tracked and compared to predicted monthly, then reported to senior management and building operators.

Key Facts:

- Solar panels’ annual thermal output is 711,000,000 BTU
- Annual gas use reduction in Central Steam Plant is 1,094,000 cu. ft.
- Annual CO2 emission reduction is 59,000 eKg CO2
- Annual cost saving due to reduced steam use is $15,700
- The solar panels will preheat the domestic hot water used in the showers at the Athletics Building
- This facility uses 15,000 Imp. gallons of hot water on an average day
- This very large solar array will eliminate 31,000 m3 of natural gas use annually
“Best in Class” Recycling Program

U of T’s recycling operation is one of the most comprehensive and successful programs of its kind in North America. Since 1991, students, faculty and staff have actively contributed to the program and helped save the equivalent of 250,000 trees, just through paper recycling alone. In 2011, our community’s combined efforts at St. George campus resulted in a **71.4% diversion rate — a 30% increase in diversion rate since 2003**! Our waste-to-landfill reduction from 1991-2011 has reached 118%, indicating that we have recycled more than we have thrown out.

In addition to the standard streams of recyclables, we also recycle electronic waste, batteries, wood, scrap metal, and organic waste.

There are also almost 30 battery depots available on all three campuses and the University has computer and electronics recycling events, toxic waste pickup events and many recycling stations for paper, bottles, plastic and cans in offices and around campus.  

www.fs.utoronto.ca/recycle.htm
Students and Staff Supporting Recycling:

- The Graduate Students Union assisted in identifying additional locations for recycling bins across campus.
- Student volunteers have worked on various projects over the years, including a study of the Swap Shop, our coffee cup recycling program, our food waste composting and our e-waste program.
- The Sustainability Food & Waste Sub-Committee holds informal discussions with students and staff to discuss projects and issues—one outcome of these discussions led to the banning of water bottles on campus.
- Orientation Week events include:
  - Staff overviews of recycling programs and waste management strategies on campus to new students.
  - Orientation Kits: Includes one reusable mug and one recycling brochure to every new student on campus.
- Recycling staff send out electronic updates to campus environmental coordinators and meet annually with them to review new programs and recycling details.
- Recycling staff hold informal sessions with students in residence to discuss efficient recycling and moving.

For 2012, Recycling & Waste Management and Food & Beverage Services distributed over 10,000 reusable mugs during orientation, reducing the amount of disposable coffee cups generated on campus by approximately 150,000.
Collaboration & Engagement

F&S working with the wider university community to achieve greater environmental impact

Recycling Programs:

**U of T Swap Shop** is a service run by Facilities and Services to keep surplus furniture, office equipment, supplies and more in use to reduce University waste at the St. George Campus. It is regularly replenished by departments that are removing their old furniture. The shop is open to the University community throughout the academic year and closes with an annual sale to benefit the United Way.

Recycling & Waste Management has also created new programs: (1) collect and recycle non-hazardous laboratory waste (plastic and glass) that is currently being landfilled; (2) collect food waste from kitchenettes and dedicated cafeterias on campus, and compost through our food waste program; (3) replaced over 100 stand-alone garbage bins with recycling depots.

**U-COMPOST AND THE GREEN TEAM**

University of Toronto Food Services has been working with the Office of Waste Management to reduce organic waste in all kitchens and cafeterias. In January 2010, green bins were installed in the three major cafeterias: Robarts Cafeteria, Sid’s Café and Medical Sciences Building Cafeteria.

To launch the composting program, and to educate the cafeteria public about the program, Food Services hired eight environmentally conscious University of Toronto students. These students, who called themselves the “Green Team” worked in the cafeterias for a week and talked to every person who walked into the cafeteria. They handed out bookmarks reminding people of what can go into the green bins and what cannot; they demonstrated the proper way to dispose organic waste, and they encouraged students to spread awareness about composting and recycling among their peers. The Green Team received positive feedback from the cafeteria public and media attention from the Bulletin (January 26, 2010 issue).

Pictured above (L-R): Ms. Kaori Yamada, Ms. Charlotte Dong, Reno Strano, and Dr. Jeffrey Gagnon
Collaboration & Engagement

F&S working with the wider university community to achieve greater environmental impact

In the spotlight ...

Community engagement is key

We are lucky to have a great community of students, faculty & staff that made it possible for us to achieve one of the highest diversion rates in any North American institution!

- Paper & cardboard
- Aluminum
- Glass
- Plastic
- Organic waste (compost)
- Construction & demolition waste (e.g. scrap metal, wood, etc.)
- Non-construction scrap wood
- Non-construction metal
- Electronics (e.g. printers, computers, cell phones, etc.)

[Our comprehensive recycling program includes almost any stream imaginable]
Collaboration & Engagement

F&S working with the wider University community to achieve greater environmental impact

There are numerous collaborative projects between staff, faculty and students in many areas and disciplines within the University — below are just some of the sustainability initiatives and projects wherein various sub-areas within the Department of Facilities & Services have collaborated with students and/or faculty:

- **“Too much light”** - A professor working in the Medical Sciences Building suggested the removal of one in four fluorescent lamps (de-lamping) within the corridors of the Medical Sciences Building. This initiative reduced electricity costs by $4,000 and helps avoid over 8,000kg of greenhouse gas each year.

- **“Urban Gardens”** - Numerous student agriculture groups have created gardens at: Hart House, UTSU Building, the Willcocks Commons, MSB patio, Anthropology Building, Sidney Smith Building, and 90 Wellesley.

- **“Pedestrian Oasis”** - Architecture students assisted in the design of the Willcocks Common. Willcocks Street was permanently closed to vehicles and converted into a basketball court, patio space and gardens.

- **“Save the Ash”** - Forestry students worked with the Dean of the Faculty of Forestry and the Grounds department to address the Emerald Ash Borer problem.

- **“Lash Miller Time”** - This project involved the Lash Miller Undergraduate Teaching Laboratories and was the pilot project of the newly created Utility Reduction Revolving Fund. The project was initiated to install remote controlled ventilation and vent alert system to cut back ventilation in newly renovated labs during off hours and weekends when no classes and experiments are being conducted. The project was successfully implemented and an estimated annual savings of 169,435 kWh of electricity will be achieved without compromising the air quality in the labs.
Collaboration & Engagement

F&S working with the wider university community to achieve greater environmental impact

More collaborative projects between staff, faculty and students in many areas and disciplines within the University and various sub-areas within the Department of Facilities & Services:

Green Roof Innovation Testing Laboratory (GRIT Lab) - Located on the rooftop of the John H. Daniels Faculty of Architecture, Landscape and Design at 230 College Street (Toronto), GRIT Lab is a state-of-the-art facility and the only one of its kind testing the environmental performance associated with green roofs, green walls and solar photovoltaic technologies in Canada. It provides a platform for multi-disciplinary research and education by linking the fields of Landscape Architecture, Biology, Hydrology and Building Science.

Sky Garden and Wind Turbine at the Galbraith Building - The Sky Garden is an urban greenhouse and food research site on the Galbraith Building rooftop, which is used to provide educational and research opportunities in organic gardening, winter gardening, composting and seed saving via workshops and tours. A recent enhancement at this site is a small PV and wind energy conversion system (WECS) being run by the Department of Electrical Engineering with cooperation of Toronto Hydro. These two systems are being integrated into the building electricity grid to ascertain the effects of variable energy inputs on an existing building electricity network.

http://uas.sa.utoronto.ca/
Steam Plant Tours

The University of Toronto has a 100-year history with centralized steam delivery. Steam generated by four massive boilers fueled by natural gas (originally fueled by coal) is delivered to many buildings across campus for heating spaces and making hot water. Waste heat produced by a jet turbine cogeneration unit installed in 1993 is also used to heat boilers and produce steam. And, during summer, steam is used by absorption chillers in the Medical Sciences Building for refrigeration.

Original article written by The Bulletin
http://www.news.utoronto.ca/content/steam-plant-tours
(Photos by Jon Horvatin)

Photos below: First-year engineering students as they tour the university’s steam plant with Boon-Teak Lee, the plant’s Chief Engineer.
In the spotlight ... U of T ST. GEORGE CAMPUS’ FOOD & BEVERAGE SERVICES

The Food Services department at U of T St. George campus provides a wide selection of healthy and affordable meals for students, staff and faculty members while incorporating green procurement strategy behind every meal they serve, every ingredient they purchase and every event they coordinate.

Source: University of Toronto Food Services Annual Report
Through initiatives such as U-Compost (see page 30), Lug-a-Mug (see page 29), trayless initiatives, and many others, Food & Beverage Services effectively combines good food with sustainability. Their programs and initiatives encourage the University community to adopt green practices that reduce waste, promote recycling and increase our institution’s commitment to the environment.

**More Collaboration & Engagement!**

**In the spotlight ... U of T St. George Campus’ Food & Beverage Services**

Through initiatives such as U-Compost (see page 30), Lug-a-Mug (see page 29), trayless initiatives, and many others, Food & Beverage Services effectively combines good food with sustainability. Their programs and initiatives encourage the University community to adopt green practices that reduce waste, promote recycling and increase our institution’s commitment to the environment.

**Sustainable Initiatives**

**U of T Water Initiative**

In conjunction with Public Water Initiative (PWI), a student group working to promote public drinking water on campus, University of Toronto Food Services formed the U of T Water Initiative. In 2009-2010, the U of T Water Initiative grew to include:

- Foodservices
- Public Water Initiative (PWI)
- ARAMARK
- University College
- Victoria College Residence
- Trinity College Residence
- Innis College Residence
- Chestnut Residence
- Facilities and Services
- a growing number of student groups

Foodservices led information campaigns to educate the University of Toronto population about the health and environmental concerns attached to bottled water; and encouraged residences and cafeterias to limit the sale of bottled water by promoting the sale of aluminum and stainless steel bottles. Over the 2009-2010 year, 1800 reusable aluminum bottles were distributed in residences, cafeterias and student lounges by the members of the U of T Water Initiative.

Further information about the U of T Water Initiative can be found at www.WaterInitiative.utoronto.ca

**Trayless Initiatives**

Organic waste scraping stations are installed in Howard Ferguson Dining Hall (University College), Audrey Taylor Dining Hall (New College) and Chestnut Tree (Chestnut Residence). These scraping stations help reduce the amount of food wasted by encouraging guests to take only as much food as they will consume.

In addition, Chestnut Tree and Howard Ferguson Dining Hall offer optional trayless dining while Audrey Taylor Dining Hall offers only trayless dining.

At New College, trayless dining has helped to reduce between 140 and 200 pounds of food waste per day. Staff at the Audrey Taylor Dining Hall has noticed that prior to mandatory trayless dining, cafeteria guests would often take food from two or three different stations, and multiple beverages. However, they would throw away 20-30% of their food at the end of their meal. With the introduction of mandatory trayless dining, the cafeteria has seen a major reduction in organic waste. This has also helped conserve hot water, energy, cleaning chemicals, and manpower. The savings from this program are being used to improve their offerings and menus, purchase more local ingredients, and provide more premium items to the New College community.

Repeat students at the cafeteria have noticed an improvement in the menu, and are happy with trayless dining. In the future, other dining halls will introduce information campaigns to educate their guests about the benefits of trayless dining.

Source: University of Toronto Food Services Annual Report

For more information, visit Sustainability at UeAT:
http://ueat.utoronto.ca/about-us/sustainability-report/
Completing a **Greenhouse Gas (GHG) inventory** is a most important step for a **carbon management plan**. The inventory clarifies the campus’ sources of emissions and serves as a baseline and guide for future reduction strategies. The inventory uses the GHG Protocol and the **Campus Carbon Calculator version 6.4 Clean Air-Cool Planet** to report emissions in Metric Tonne Carbon Dioxide Equivalents (mtCO2e) according to their global warming potential (GWP).

The GHG inventory herein covers the calendar years 2004 to 2012 and is limited to **scope 1 and 2 emissions** for the St. George campus. Beyond supplying electricity, heating and cooling to over 100 buildings on the St. George campus, the district energy system serves many third party buildings not under our operating control. Examples of some of the third party buildings include: the Federated colleges, affiliated colleges (i.e. Knox College) and the ROM. The GHGs associated with the non-UofT buildings supplied through the St. George district energy system is identified within the inventory and account for almost **10%** of the total greenhouse gases produced by St. George. The intensity graphs shown in this report refer to operations and buildings under our operational control only and therefore exclude the third party buildings supplied through our district energy system.

We have limited the report on GHG emissions to Scope 1 and Scope 2 only as these are associated with the University’s direct activities. Scope 3 emissions are excluded because they are the result of activities of other entities and we do not have a comprehensive list of all scope 3 activities and emissions.
Definition of Scope 1: (Direct Emissions)
The GHG Protocol defines Scope 1 emissions as all direct GHG emissions from sources under the University’s control. Included is the generation of electricity, heat, or steam from fossil fuels. Within the University, this included stationary emissions (natural gas consumption), owned vehicle fleets (machinery and automotive vehicles), fugitive emissions (leakage from refrigerants in air conditioning equipment), and fertilizer application.

Definition of Scope 2: (Indirect Emissions)
Scope 2 emissions include all emissions associated with purchased electricity, heat or steam. For many organizations, Scope 2 emissions represent a large proportion of GHG emissions. Accounting for Scope 2 emissions allows organizations to assess the risks and opportunities associated with changing electricity provided. Scope 2 emissions for the University include purchased electricity, purchased steam and purchased chilled water.

Definition of Scope 3: (All Other Indirect Emissions)
Scope 3 includes all emissions from outsourced activities. Such emissions may have resulted from the activities of community members at the University, but occurred at sources owned and controlled by another organization (e.g. air travel, solid waste management, commuting activities). These are the most difficult emissions to track as organizations as the activities are largely out of our control. We do not focus on these emission sources in this report.
WHERE WE ARE TODAY...

Greenhouse Gas Inventory

MEASURING OUR PERFORMANCE — YOU CAN’T MANAGE WHAT YOU DON’T MEASURE!

For the calendar year 2012, the campus emitted a total of 123,594 tonnes of CO2 in scope one and two activities. If we look at only university buildings where we have operational control, the total is 112,887 tonnes of CO2.

Scope 1: Direct Emissions
The data showed that over 87% of the University’s Scope 1 emissions come from the burning of natural gas. U of T operates a large natural gas fired heating plant and an electricity generating plant also fired from natural gas. These systems generate steam and electricity for both the U of T campus and other facilities not under the University’s control.

On site, stationary fuel source emissions include the natural gas fired co-generation plant, the natural gas fired central utility plant, distillate oil, and natural gas used in other buildings. The natural gas consumption data showed that this fuel combustion is responsible for 86.8% of the Scope 1 emissions, equivalent to 69,502 mtCO2e of emissions.

Fleet vehicle transportation emissions include emissions from grounds equipment, facilities service vehicles, security vehicles, and any other University owned vehicles. The fleet consumed 64,111 litres of gasoline, 6,787 litres of diesel, and 536 m3 of natural gas, generating 0.21% of Scope 1 emissions, equivalent to 168 mtCO2e of emissions. Data regarding the University’s annual fuel use, measured in litres, was used to calculate these emissions.

The remainder of Scope 1 emissions come from fugitive emissions derived from chemicals used in the University refrigeration equipment. These chemicals include chlorofluorocarbons (CFC), perfluorocarbons (PFC), hydrofluocarbons (HFC) and SF6. The Facilities and Services Department gathered data based on the amount of refrigerant that service technicians added to their systems in the base year. These emissions only account for 1.2% of Scope 1, equivalent to 951 mteCO2 of emissions.
Scope 2: Indirect Emissions

Scope 2 emissions include purchased electricity, steam, and chilled water. The majority of these emissions came from electricity used to power the University’s buildings. Together they accounted for 35.2% of the total GHG emissions. The University redistributes some of the electricity purchased from the utility to other buildings. Although these buildings are outside of the University’s control, the emissions were included in the inventory. Using the Campus Carbon Calculator, the inventory concluded that purchased electricity accounted for 87.1%, purchased steam accounted for 9.9%, and purchased chilled water accounted for 0.03% of the total emissions.

These two graphs show the campus GHG emissions over time in relation to the campus population and total square footage. More students and more buildings would generally equate to more GHG, however, we have actively managed our use of energy and water which has resulted in minimizing the impact of new students and buildings. Despite many new buildings, many new students, and the growth of our summer programs (now over 23,000 students are on campus in the summer semester) our GHG emissions have actually gone down!
WHERE WE ARE TODAY ...

Campus Internal Benchmarking: Intensities

MEASURING OUR PERFORMANCE — YOU CAN'T MANAGE WHAT YOU DON'T MEASURE!

Since 1973, we have successfully avoided over 1 million tonnes of GHG at the St. George campus. However, our GHG intensity per square metre has risen over the past few decades primarily as the result of a number of new research intensive buildings that have been added to the campus.

These buildings include Earth Science, the Davenport Wing of Lash Miller, CCBR, Leslie Dan Pharmacy, and the CBTC addition to Ramsay Wright. As the student population has significantly increased on campus, our intensity of GHG per student has been reduced.

* Equivalent carbon dioxide (eCO₂) allows emissions of greenhouse gases of different strengths to be added together. For carbon dioxide itself, emissions in tonnes of CO₂ and tonnes of eCO₂ are the same thing, whereas for methane, an example of a stronger GHG, one tonne of methane emissions has the same GWP as 21 tonnes of CO₂. Thus, 1 tonne of methane emissions can be expressed as 21 tonnes eCO₂.
WHERE WE ARE TODAY ...

Campus Internal Benchmarking: Intensities

MEASURING OUR PERFORMANCE — YOU CAN’T MANAGE WHAT YOU DON’T MEASURE!

Over the past four decades, we have been able to save 79 billion litres of water at the St. George campus despite the large increase in students and buildings. We actually use less water today than we did in 1973. Our intensities of water use have consistently trended down over the years as a result of many initiatives.

In fact, since 1973, we have saved almost as much as we have actually used up to 2012.
WHERE WE ARE TODAY ...

Campus Internal Benchmarking: Intensities

MEASURING OUR PERFORMANCE — YOU CAN’T MANAGE WHAT YOU DON’T MEASURE!

Facilities and Services initiatives have saved over 13.5 gigajoules of natural gas since 1973. Our thermal intensity has remained flat on a square footage basis despite the energy intensive research buildings that have been added over the past two decades.

Part of our success in this area are the many roof replacements we have undertaken with our cool roofing standard.

As we accommodate more students on the campus, without a corresponding increase in building square footage, our intensity per student has trended down.
Since 1973, our electrical conservation efforts have resulted in saving over 270 million kWh at the St. George campus.

Without conservation, our intensity would have continued to trend upwards mainly because of factors such as the increase in research intensive buildings and the growth of building plug loads. Computers, printers, and other electronic devices and equipment have permeated the campus buildings with a corresponding increase in electrical use.
A very good indicator of how a building performs in the winter is to use a well-known factor called a "heating degree day" or HDD. This is a measure of how cold it is and therefore, how much thermal energy is needed to keep a building above a comfortable temperature (i.e. 18°C).

For any given HDD, a building will use a certain amount of heat. For the same HDD, a smaller number on this graph indicates that we have provided comfort with less energy — the graph shows that we are reducing the use of energy while maintaining comfort.
MEASURING OUR PERFORMANCE

In the spotlight ...

THE SUSTAINABILITY KIOSK & BUILDING DASHBOARD

The sustainability kiosk on the St. George campus promotes environmental awareness by keeping the University community informed of sustainable projects and their impressive results. The wall-mounted display scrolls through a series of "Did You Know's" that highlight the University's top achievements in sustainability. The touch-screen kiosk exhibits the achievements in more detail in an interactive timeline from 1973 to the present.

Other aspects of the kiosk include an interactive map of all St. George campus buildings and details about their individual environmental footprints, as well as general information about Facilities and Services. It also provides information about how students, faculty and staff can get involved in making our campus more sustainable.

The sustainability timeline website www.sustain.fs.utoronto.ca/sustainability-timeline/ contains the same information that can be found on the kiosk. This project was a collaborative team project. The idea was conceived by the AVP, Facilities & Services and three Facilities & Services staff members worked together in developing and launching the project that won them the Excellence through Innovation Awards in 2011.

Sustainability Kiosk Building Intensities Feature

This feature can also be viewed by visiting the Facilities & Services website at: www.sustain.fs.utoronto.ca/campus-footprint/

The Sustainability Kiosk features a lot of cool building information features including interactive campus maps, and utilities use of the buildings on campus such as water, electricity, thermal energy and carbon footprint.

Below is a snapshot of online energy, water, and GHG intensities of buildings on campus

Check out the Kiosk video at http://www.youtube.com/watch?v=78wNVohKidY or scan the code with your smartphone
Green Buildings

Mining Building Renovation (LEED Gold Anticipated) ➔

Exam Centre/255 McCaul Street (St. George) — First LEED Gold Certified Project at U of T

The offices of the department of Facilities & Services and University Planning, Design & Construction are located within the Exam Centre at 255 McCaul Street which is LEED Gold Certified (certified in 2010) and includes the following energy-saving features:

♦ Compared to a typical building, the Exam Centre uses 15% less energy.

♦ Uses 62% less water by capturing rainwater from the roof.

♦ The office is 25% more space efficient than our former offices and 90% of regularly occupied workspaces have outside views and provide staff with natural light.

♦ The building also supports alternative transportation with designed carpool parking spots and indoor bike lockups.

Visit http://www.sustain.fs.utoronto.ca/exam-centre-leed-features/ for more information.

See page 6 and read about how this project illustrates perfectly the triple bottom-line of sustainability.

Transformed Lassonde Mining Building Celebrated

New space supports student learning and adds sustainable features to heritage building
Author: Liam Mitchell

(Excerpt:)

The University of Toronto celebrated the opening of the renovated Lassonde Mining Building on Nov. 28. The transformation of the building, which first opened in 1904, converted the previously unused attic into new collaborative student design studios and teaching spaces and added a rooftop meeting room.

“We are celebrating a new chapter of mining innovation at the University of Toronto with the opening of this building,” said David Naylor, president of the university.

The new 4th and 5th floor space, known as the Goldcorp Mining Innovation Suite, provides 100 workstations for students studying mineral and civil engineering to complete engineering design projects. It will also be home to the Lassonde Institute of Mining, an interdisciplinary research institute focused on a whole spectrum of mining activities, including mineral resource identification, mine planning and excavation, as well as extraction and processing. In addition to classes, the suite will host public events ranging from small meetings to seminars and lectures.

In addition to new space, the project allowed a number of sustainable features to be added to the building. This includes photovoltaic panels that power the new suite’s lighting and computer needs. It also includes improved insulation, the addition of skylights and rain harvesting to water the surrounding grounds. An elevator was also added, making the building more physically accessible.

For the full article, visit: http://news.utoronto.ca/transformed-lassonde-mining-building-celebrated
Green Buildings

Rotman School of Management Project — LEED Silver Anticipated

LEED stories worth telling.
In the Rotman expansion

75% of construction waste has been diverted to date

50% of wood based materials are from sustainable sources

The new Rotman expansion will boast a Silver Leadership in Energy and Environmental Design (LEED) rating. Here are some of the ways we’ve been able to achieve this designation. To learn more about LEED visit www.usgbc.org

5% of construction, demolition and land clearing waste was recycled and/or salvaged

More Bike Racks will be installed beside the new lane entrance, near St. George Street. Rotman is already bike-friendly place and this will make it even easier to leave the car at home.

32% of all materials used were processed and manufactured locally.

Source: http://www.rotman.utoronto.ca/Connect/RotmanAdvantage/Room%20to%20Grow.aspx
Green Buildings

Munk School of Global Affairs — LEED Silver Anticipated
(315 Bloor Street West)

315 Bloor Street West has a rich history. Originally constructed in 1909, and designed by noted Toronto architects Burke and Horwood, the building served as a meteorological observation centre and home to the Dominion Meteorological Service well into the latter half of the twentieth century. In 1975, the University of Toronto took over possession of the property and made the historic building its admissions and awards office. For a further thirty-five years the building served as a gateway to the campus and a place of welcome for all new students being admitted to the university.

It has now been restored and renovated to reflect both its heritage and new purpose as a home for the Munk School of Global Affairs. Designed by Kuwabara Payne McKenna Blumberg Architects, it is a beautifully renovated space that reflects the historic character of the original building—serving not only as a home to students and faculty of the Munk School but as a gateway to the University of Toronto for visiting delegations, heads of state and experts from around the world.


LEED stands for Leadership in Energy and Environmental Design. It is a third-party certification program and an internationally accepted benchmark for the design, construction and operation of high performance green buildings. LEED promotes a holistic approach to sustainability by recognizing performance in five key areas of human and environmental health which include sustainable site development, water efficiency, energy efficiency, materials selection, and indoor environmental quality.
WHERE WE ARE GOING ...

The Road Ahead

Evolution of the St. George Campus

We know the only constant in life is change. Going forward, several factors will affect the built environment at St. George. The first is the pressure for more space. The St. George campus is presently well below the Council of Ontario Universities (COU) space standards. In fact the campus is currently operating at under 80% of the COU standard. That is equivalent to several millions square feet of space.

To meet our space needs, the University has several new buildings underway or in the planning phases. The Goldring Centre for High Performance Sport, the new Law buildings and the new home for the Faculty of Architecture are all moving toward completion. Other faculties, such as the Faculties of Engineering and Medicine, have buildings under consideration.

In 2027, The University of Toronto will celebrate its two hundred year anniversary. To continue our success into and beyond our second centennial, President David Naylor launched ‘Towards 2030’, a long-term planning initiative to address the question: how can the University reach new levels of excellence as we move into the future?

The plan outlines the University's long-term priorities and develops a strategic framework to achieve our future goals. One of the University's priorities is to attend to the growing demand of graduate and professional degree enrolment. According to the initiative, “A presumptive goal is that, by 2030, on-site graduate enrolments will comprise at least 35 per cent of the student head-count on the St. George campus [which will happen] through a blend of modest reductions in undergraduate enrolment and growth in graduate numbers”.

Photo by Andrea Shabbar

Photo by Michael Baker
How will the 2030 Academic Plan and other factors affect the St. George Campus?

The 2030 plan’s emphasis on research and graduate students at the St. George campus will necessitate changes to the fabric of the St. George buildings. These activities, while central to the institution’s future success, will require both more space and space that is more energy intensive than undergraduate or teaching space.

Still another factor which affects the St. George campus is the better utilization of our existing buildings throughout the year. The St. George campus now has a very robust summer semester. At present, summer student enrolment is over 23,000 (larger than the peak enrolment of over half of the universities in Ontario).

Goals and Strategies Related to F&S Activities

Taken together, the new buildings, the 2030 strategic direction, and the growth in the summer semester, all lead to a clear reality – St. George campus will grow in occupancy, it will grow in research intensive activity, and it will grow in gross square footage. This growth will have a corresponding increase in the use of utilities generating more greenhouse gases (GHG) unless we act.

The goal of the Facilities and Services department will be to mitigate the environmental effects of the additional and more energy and water intensive space that will be added to the St. George campus.

Our strategies to achieve this will be:

First and foremost, we want to engage and leverage our community.

- Leverage the Energy Reduction Management Fund (ERMF) to harness the ideas of the U of T community.
- Utilize the Utilities Reduction Revolving Fund (URRF) to fund numerous water, electricity and natural gas reduction projects to our district energy systems and buildings.
- Engage the campus staff, students, and faculty through the Sustainability Office to promote occupant programs and leverage our new electronic metering network to identify opportunities for savings as well as engage occupant strategies to reduce plug loads in buildings.
Where we are going ...  The Road Ahead

Challenges & Opportunities

“Strategies “continued ...

Secondly, we will build on our strong legacy of reducing utilities by retrofitting buildings.

♦ We will build on the success of the MSB retrofit and undertake other projects which will significantly reduce GHG’s.
♦ We will continue to keep sustainability a priority in all projects we undertake. For example, our cool roof standard, which has been installed in over ½ million square feet of flat roof at St. George, has saved the University over $1.2 million in gas and electricity.
♦ We will promote and support energy and water efficient systems be built into the new campus buildings.

Other Facilities and Services goals include:

Transition purchasing decisions towards producers and suppliers who have adopted environmentally responsible practices.

♦ One area where this can be deployed is in the management of fleet vehicles. We plan to meet this goal by replacing fleet vehicles with high efficiency vehicles where appropriate and economically feasible. To date, 23% of F&S vehicles meet this criteria. Currently, we have 2 natural gas vehicles, 6 hybrids, and 3 electric vehicles on our fleet.

Other strategies include:

♦ Energy Star appliances/electronics are purchased whenever possible—i.e. copiers, computer equipment, and appliances for office at 255 McCaul Street
♦ Eliminating bottled water purchases for Facilities & Services’ administrative offices
♦ Procurement of green cleaning products
♦ Lighting products that are more energy efficient and sustainable
♦ Sustainability Office working on sustainable product standards for U of T

Reduction of emissions resulting from F&S campus fleet

Strategies to meet this goal include:

♦ Convert fleet to ultra-high efficiency vehicles where practical to do so
♦ Promote biking on campus by purchasing over 40 bikes for F&S staff and supporting the expansion of the Bikechain program
♦ Use a fleet management service to optimize the maintenance of our fleet of vehicles

Photo by Caz Zyvatkauskas
Other Facilities and Services goals (continued):

**Maintain our campus diversion rate over 70% going forward**
*Strategies to meet this goal include:*
- Continue to promote the fabulous commitment demonstrated by the community to this program
- Minimize the use of hand towels in washrooms through dispensers that limit quantities
- Eliminate hand towels in high-use washrooms by installing efficient hand-dryers
- Continue to innovate and expand our recycling program such as the recent addition of non-hazardous laboratory glass and plastics recycling program *(for more information, visit: [http://www.fs.utoronto.ca/recycle/Non-hazardous_Lab_GlassandPlastics.htm](http://www.fs.utoronto.ca/recycle/Non-hazardous_Lab_GlassandPlastics.htm))*
- Ensure that construction debris is limited and that we recycle at least 75% of the construction waste on all major capital projects
- Continue to utilize and promote the *Swap Shop* which redeployes campus waste by keeping surplus furniture, office equipment, and supplies in use and available to members of the U of T community

**Reduce use of storm sewers and domestic water use**
*Strategies to meet this goal include:*
- Continue to convert paths to permeable type materials, install additional French drains, redirect rain leaders to gardens
- Ensure domestic water conservation by continuing to convert air conditioning units cooled by domestic water to air cooled units, fine tune our weather base irrigation control system, employ rain water capture in new buildings, install cisterns in existing buildings, continue to convert all existing washroom fixtures to water efficient toilets, faucets, and urinals, and landscape new buildings with low water tolerant plants
Excerpt:

**Council of Ontario Universities releases “Going Greener” Report**

“The environmental footprint of Ontario universities is shrinking” - Bonnie Patterson, President and CEO of the Council of Ontario Universities.

On June 11th the Council of Ontario Universities (COU) released its annual Going Greener Report in an event held at the University of Toronto’s St. George campus. In its fourth year of being published, the report surveys all 22 Ontario university campuses and highlights the new and innovative environmentally friendly initiatives that have been undertaken by these campuses in 2012.

The report highlights how, in the last year, campuses have implemented sustainable transportation by introducing protected bike racks, discount transit passes, and an increased fleet of hybrid and electrical vehicles. Sustainability in campus food services, energy and water conservation and waste reduction have also seen an improvement across all 22 campuses, according to the report.

**Toronto Hydro and the University of Toronto Sustainability Office Celebrate Conservation Savings**

Excerpt:

Toronto Hydro is honoured to receive the 2013 Green Ribbon Award from the University of Toronto’s Sustainability Office. For more than five years, the Green Ribbon Awards have recognized the outstanding contributions and achievements of students, staff, faculty and external partners who have minimized environmental impacts, conserved natural resources and promoted biodiversity at the University of Toronto’s St. George campus.

This year’s award recognized Toronto Hydro in the External category for its efforts in assisting the University of Toronto with achieving ambitious energy conservation reduction goals through support from our staff and saveONenergy\textsuperscript{TM} conservation programs. This award marks and celebrates a long standing relationship between the two organizations that is leading electricity savings and shifting conservation behaviour in Toronto.

From 2006 to date, the University of Toronto has:
- achieved almost 2,300 kW of electricity demand savings;
- attained over 14,000 MWh of electricity energy savings; and
- received more than $1 million of reimbursement through various conservation programs.

The University has additional projects planned for 2013 and 2014 and expects to realize even more savings in electricity.